

## CLAIMS

1. An optical link from one terminal to another comprising a series of normalised spans interconnecting nodes between the terminals, dispersion compensation means applying dispersion compensation to each span, wherein each span contributes noise and the total noise in the link is the sum of the contributions from each span and wherein the amount of dispersion compensation applied to each span by the dispersion compensation means is determined in accordance with the noise contribution of that span.
2. An optical link according to claim 1 wherein a maximum allowable noise is defined for the link and the sum of the noise contributions from each span is less than the maximum allowable noise.
3. An optical link according to claim 2 wherein residual or excess dispersion in any span reduces the acceptable noise for the link and the number of spans is such that the sum of the noise contributions does not exceed the maximum allowable noise.
4. An optical link according to claim 2 wherein the dispersion compensation applied to each span by the dispersion means is determined in accordance with the noise contribution of that span in relation to the maximum allowable noise.
5. An optical link according to any claim 1 wherein the link has an optimum dispersion compensation value.
6. An optical link according to claim 5 wherein the dispersion compensation applied to each span equals:
 
$$\frac{\text{Span noise contribution}}{\text{Maximum allowable noise}} \times \text{Optimum dispersion compensation}$$

7. An optical link according to claim 1 wherein the dispersion compensation means comprises a series of dispersion compensation modules.

8. An optical link according to claim 7 wherein a dispersion compensation module is located at a node so as to pre- or post-compensate an adjacent span.

9. An optical link according to any claim 1 further comprising amplification means normalising each span.

10. An optical link according to claim 9 wherein the amplification means comprises a series of optical amplifiers.

11. An optical link according to claim 10 wherein an optical amplifier is located at a node so pre- or post-amplify a signal in an adjacent span.

12. An optical link according to claim 1 wherein the series of spans are not normalised and the total noise in the link is the result of the contributions from each span.

13. Dispersion compensation means for applying dispersion compensation a span in an optical link from one terminal to another, having a series of normalised spans interconnecting nodes between the terminals, wherein each span contributes noise and the total noise in the link is the sum of the contribution from each of the spans, the dispersion compensation means applying to each span dispersion compensation determined in accordance with the noise contribution of that span.

14. Dispersion compensation means according to claim 13 comprising a series of dispersion compensating modules.

15. Dispersion compensation means according to claim 14 wherein a dispersion compensation module is located at a node so as to pre- or post-compensate an adjacent span.

5 16. Dispersion compensating means according to claim 14 wherein each span is an optical fibre span and each dispersion compensation module comprises at least one of: dispersion compensating optical fibre, fibre grating, virtually imaged phase array, MEMS etalon, cascaded Mach Zehnder.

10 17. A span in a link from one terminal to another, having a series of normalised spans interconnecting nodes between the terminals, wherein the spans contribute noise and the total noise in the link is the sum of the contributions from each of the spans, the said span having applied thereto dispersion compensation determined in accordance with the noise contribution of that span.

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18. An optical communications network comprising a link according to claim 1

19. An optical communications network comprising dispersion compensation means according to claim 13.

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20. An optical communications network comprising a span according to claim 17.

21. A node in an optical communications link comprising dispersion  
25 compensation means according to claim 13.

22. A method of dispersion compensation in a link from one terminal to another, having a series of normalised spans interconnecting nodes between the terminals, wherein each span contributes noise and the total noise in the link is the sum of the  
30 contributions from each span, the method comprising applying dispersion compensation to each span in accordance with the noise contribution of that span.

23. A method according to claim 22 wherein the series of spans are not normalised and the total noise in the link is the result of the contributions from each span.

- 5 24. An optical fibre link from a transmitter to a receiver comprising a series of normalised optical fibre spans interconnecting nodes between the transmitter and the receiver, a dispersion compensation module at each node applying dispersion compensation to an adjacent span, wherein each span contributes noise and the total noise in the link is the sum of the contributions from each span and wherein the
- 10 amount of dispersion compensation applied to a span by a module is determined in accordance with the noise contribution of that span.